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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,857	12/23/1999	QIZHENG GU	863.0021.U1(US)	8032

29683 7590 05/17/2007
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EXAMINER	
WILLIAMS, LAWRENCE B	
ART UNIT	**PAPER NUMBER**
2611	

MAIL DATE	DELIVERY MODE
05/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

5f

Office Action Summary	Application No.	Applicant(s)	
	09/471,857	GU, QIZHENG	
	Examiner	Art Unit	
	Lawrence B. Williams	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6-13,15,16 and 20-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 6-13, 15-16, 20-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 6-13, 15-16, 20-40 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 12 recites the method of claim 1, further comprising the step of **filtering said intermediate** signal to attenuate at least one signal outside the common frequency spectrum before performing said step of down-converting. However, the intermediate signal is formed after down-conversion according to claim 1. The examiner assumes applicant means ""filtering said RF signal".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 6-12, 21-22, 25-26, 28, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Smith et al. (US Patent 6,389,059 B1) and further in view of Sakoda et al. (US 2001/0043583 A1).

(1) With regard to claim 1, Applicant's Admitted Prior Art discloses in Fig(s). 3, 4, a method for receiving a signal, said method comprising the steps of receiving an RF signal (pg. 3, lines 17-18), said RF signal comprising a plurality of information channel signals each comprising different code division multiple access data spread using a different spreading codes, wherein each of said plurality of information channel signals are transmitted in one of a plurality of transmission bands, and each of said plurality of information channel signals is carried on one of a plurality of carrier frequencies (pg. 2, line 26 - pg. 3, line 13); down-converting said RF signal by a single down-converter to form an intermediate signals (pg. 3, lines 26- 28) wherein said intermediate signal comprises: down-converted versions of each of said plurality of information channel signals, and said down-converted versions of each of the plurality of information channel signals are generated from a plurality of frequencies (pg. 3, line 28 - pg. 4, line 5) and said down-converted versions of each of said plurality of information channel signals are within a common frequency spectrum (lines 3-5 of pg. 4) discloses the bandwidth of the three IF MC-CDMA band approximately equal to 3.7 MHz total. Therefore the three IF MC-CDMA bands are within the frequency spectrum used for transmitting (pg. 3, lines 4-6); and decoding said intermediate signal to extract data from said down-converted versions of each of said plurality of information channel signals (pg. 3, lines 19-20).

Applicant's Admitted Prior Art does not teach wherein the single down converter is arranged to receive said RF signal and multiply said RF signal by a plurality of oscillator signals

when operating in a first mode and multiply said RF signal by a single oscillator signal when operating in a second mode.

However, Smith et al. teaches in the same endeavor in Fig. 3, a multi-band, multi-mode spread-spectrum communication system wherein he teaches single down converter (209) is arranged to receive an RF signal and multiply said RF signal by a single oscillator signal when operating in a first or second mode. Smith et al. discloses the invention having two or more modes (col. 2, lines 61-67; col. 3, lines 49-51). Smith et al. discloses the frequency converter (209) multiplying the input RF signal by an oscillator signal (dependent upon the mode) supplied by the tunable frequency synthesizer (105) col. 8, lines 28-52). Smith et al. does not explictly teach the down converter multiplying of the RF signal by a plurality of oscillator signals though he does teach the receiver capable of operating at more than two modes, among them a multiple frequency mode (col. 9, lines 24-28). It would be obvious to one of ordinary skill in the art that the frequency synthesizer would supply a plurality of oscillator signals during the operation of this mode to form multiple f_{Lo} signals for down conversion of the multiple frequency signals.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Smith et al. as a method lowering cost and weight of the device (col. 2, lines 34-46).

As noted above, Smith et al. does not explictly teach the down-converter multiplying of the RF signal by a plurality of oscillator signals. However a down converter multiplying an RF signal by a plurality of oscillator signals is well known in the art as disclosed by Sakoda et al. Sakoda et al teaches in Fig. 4, a single down converter (15) for multiplying an RF signal by a

plurality of oscillator signals (pg. 3, paragraph 0039). Sakoda et al. teaches the frequency synthesizer generating signals at an interval of 150 kHz being supplied to the down converter.

It would have been obvious to one skilled in the art to incorporate the teachings of Sakoda et al. for down conversion of each carrier frequency contained in a multicarrier or multi-band signal to obtain the data carried on each carrier frequency.

(2) With regard to claim 6, Applicant's Admitted Prior Art teaches that according to MC-CDMA standards that adjacent carrier frequencies of the RF bands have a frequency spacing of 1.25 MHz.

(3) With regard to claim 7, Applicant's Admitted Prior Art also teaches the method of claim 1, wherein said common frequency spectrum comprises a first common frequency spectrum (pg. 4, line 5), and the step of decoding said intermediate signal comprises the step of forming a baseband signal by down-converting said first common frequency spectrum to a second common frequency spectrum, said second common frequency spectrum lower in frequency than said first common frequency spectrum (pg. 4, lines 6-16).

(4) With regard to claim 8, Applicant's Admitted Prior art also teaches in Fig. 3, the method of claim 7, wherein the step of forming said baseband signal further comprises down-converting the intermediate signal using a first oscillator signal to form a first baseband component signal and a second oscillator signal to form a second baseband component signal, the first and second oscillator signals each at a same frequency and a different phase (pg. 4, lines 6-25).

(5) With regard to claim 9, Applicant's Admitted Prior art also teaches the method of claim 8, wherein said first baseband component comprises a first folded signal and said second

baseband component comprises a second folded signal, each folded signal having a frequency spectrum narrower than said first common frequency spectrum (pg. 4, lines 13-16).

(6) With regard to claim 10, Applicant's Admitted Prior art also teaches the method of claim 9 further comprising the steps of: sampling said first baseband component to form a first digital representation; sampling said second baseband component to form a second digital representation; and combining said first and said second digital representations to form an unfolded signal, said unfolded signal having a frequency spectrum greater than the spectrum of the first folded signal (pg. 4, line 26-pg. 5, line 17).

(7) With regard to claim 11, Applicant's Admitted Prior Art also teaches wherein the step of receiving an RF signal comprises receiving an RF signal from a cellular base station (pg. 3, lines 4-5).

(8) With regard to claim 12, Applicant's Admitted Prior Art also discloses in Fig(s). 2, 3, the method of claim 1 further comprising the step of filtering said RF signal to attenuate at least one signal outside the common frequency spectrum before performing said step of down-converting.

(9) With regard to claim 21, claim 21 is an apparatus claim corresponding to method claim 1, and recites substantially very similar limitations and therefore is similarly analyzed as method claim 1.

(10) With regard to claim 22, claim 22 discloses limitations substantially similar to those disclosed in claim 6. Therefore a similar rejection applies.

(11) With regard to claim 25, claim 25 is an apparatus claim corresponding to method claim 1, and recites substantially very similar limitations and therefore is similarly analyzed as method claim 1.

(12) With regard to claim 26, claim 26 discloses limitations similar to those disclosed in claims 6, 22. Therefore a similar rejection applies.

(13) With regard to claim 28, Applicant's Admitted Prior Art also teaches in Fig(s) 3, 4, the method of claim 1, further comprising amplifying, filtering, and amplifying (element 303) the received RF signal before down converting it.

(14) With regard to claim 35, Applicant's Admitted Prior Art also teaches the method of claim 1, wherein the intermediate frequency accommodates multiple intermediate frequency bands (pg. 3, lines 26-30).

6. Claims 13, 27, 29-34, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Smith et al. (US Patent 6,389,059 B1) and further in view of Sakoda et al. (US 2001/0043583 A1).

(1) With regard to claim 13, Applicant's Admitted Prior Art discloses in Fig(s). 3, 4, a mobile radio telephone unit comprising: an antenna (301) configured to receive an RF signal (pg. 3, lines 17-18), said RF signal comprising a plurality of information channel signals each comprising different code division multiple access data spread using a different spreading codes, wherein each of said plurality of information channel signals are transmitted in one of a plurality of transmission bands, and each of said plurality of information channel signals is carried on one of a plurality of carrier frequencies (pg. 2, line 26 - pg. 3, line 13); a single down-converter

(304) to form an intermediate signals (pg. 3, lines 26- 28) wherein said intermediate signal comprises: down-converted versions of each of said plurality of information channel signals, and said down-converted versions of each of the plurality of information channel signals are generated from a plurality of frequencies (pg. 3, line 28 - pg. 4, line 5) and said down-converted versions of each of said plurality of information channel signals are within a common frequency spectrum (lines 3-5 of pg. 4 discloses the bandwidth of the three IF MC-CDMA band approximately equal to 3.7 MHz total. Therefore the three IF MC-CDMA bands are within the frequency spectrum used for transmitting (pg. 3, lines 4-6); and a decoder (350) operatively coupled to the single down-converter and configured to decode said intermediate signal to extract data from said down-converted versions of each of said plurality of information channel signals (pg. 3, lines 19-20).

Applicant's Admitted Prior Art does not teach wherein the single down converter is arranged to receive said RF signal and multiply said RF signal by a plurality of oscillator signals when operating in a first mode and multiply said RF signal by a single oscillator signal when operating in a second mode.

However, Smith et al. teaches in the same endeavor in Fig. 3, a multi-band, multi-mode spread-spectrum communication system wherein he teaches single down converter (209) is arranged to receive an RF signal and multiply said RF signal by a plurality of oscillator signals when operating in a first mode and multiply said RF signal by a single oscillator signal when operating in a second mode. Smith et al. discloses the invention having two or more modes (col. 2, lines 61-67; col. 3, lines 49-51). Smith et al. discloses the frequency converter (209) multiplying the input RF signal by an oscillator signal (dependent upon the mode) supplied by

the tunable frequency synthesizer (105) col. 8, lines 28-52). Smith et al. does not explictly teach the down converter multiplying of the RF signal by a plurality of oscillator signals though he does teach the receiver capable of operating at more than two modes, among them a multiple frequency mode (col. 9, lines 24-28). It would be obvious to one of ordinary skill in the art that the frequency synthesizer would supply a plurality of oscillator signals during the operation of this mode to form multiple f_{Lo} signals for down conversion of the multiple frequency signals.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Smith et al. as a method lowering cost and weight of the device (col. 2, lines 34-46).

As noted above, Smith et al. does not explictly teach the down-converter multiplying the RF signal by a plurality of oscillator signals. However a down converter multiplying an RF signal by a plurality of oscillator signals is well known in the art as disclosed by Sakoda et al. Sakoda et al teaches in Fig. 4, a single down converter (15) for multiplying an RF signal by a plurality of oscillator signals (pg. 3, paragraph 0039). Sakoda et al. teaches the frequency synthesizer generating signals at an interval of 150kHz being supplied to the down converter.

It would have been obvious to one skilled in the art to incorporate the teachings of Sakoda et al. for down conversion of each carrier frequency contained in a multicarrier or multi-band signal to obtain the data carried on each carrier frequency.

(2) With regard to claim 15, Sakoda et al. teaches the single down–converter (15) configured to down-convert by a plurality of oscillator signals having a lower frequency (pg. 3, paragraph 0039). Sakoda et al. teaches using a 1/128 frequency divider as a reference.

(3) With regard to claim 16, Sakoda et al. also discloses wherein said single down-converter (15) comprises an oscillator (32) for generating a plurality of oscillator and a single oscillator signal a frequency spacing between each adjacent pair of plurality of carrier frequencies and between each adjacent pair of oscillator signals substantially the same (pg. 3, paragraph 0039). Sakoda et al. teaches the down converter (15) using a signal output by the frequency synthesizer and the frequency synthesizer also configured to generate signals at an interval of 150 KHz, the interval of each band slot.

(4) With regard to claim 27, Applicant's Admitted Prior Art also teaches in Fig. 3, wherein each down converted version is processed by circuitry (406A, 406B) that processes all other down-converted versions from the down-converter to the decoder.

(2) With regard to claim 29, Applican's Admitted Prior Art also discloses in Fig(s). 3, 4, the mobile radio telephone unit of claim 13, further comprising a first filter (302), a first amplifier (LNA), a second filter (BPF), and a second amplifier (RFA), wherein the received RF signal is successively filtered, amplified, filtered, and amplified before being down converted by the single down converter.

(3) With regard to claim 30, Applicant's Admitted Prior Art also teaches the mobile radio telephone unit of claim 29, further comprising a down converter (308, 309) that converts the down-converted received RF signal to in phase (I) and quadrature (Q) component signals.

(4) With regard to claim 31, Applicant's Admitted Prior Art also discloses the mobile radio telephone unit of claim 13, further comprising an amplifier (RFA) amplifying the received RF signal before it is down converted by the single down converter.

(5) With regard to claim 32, Smith et al. also discloses the mobile telephone unit further comprising an oscillator for generating the plurality of signals (col. 8, lines 39-42).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Smith et al. as a method lowering cost and weight of the device (col. 2, lines 34-46).

(6) With regard to claim 33, Smith et al. also discloses in fig. 3, wherein the oscillator comprises a synthesizer (105).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Smith et al. as a method lowering cost and weight of the device and a known method of generating a plurality of oscillator signals (col. 2, lines 34-46).

(7) With regard to claim 34, Applicant's Admitted Prior Art also teaches in Fig. 4, wherein each of the received RF signals follow a single path (LNA BPF, RFA) to the down converter.

(8) With regard to claim 36, Sakoda et al. also discloses in Fig. 4, the mobile telephone unit, wherein the oscillator comprises a mixer (15).

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Smith et al. (US Patent 6,389,059 B1).

Applicant's Admitted Prior Art discloses in Fig. 4, a CDMA receiver for operating in a first mode and a second mode (pg. 22-26), said receiver comprising: an initial RF stage (303) for outputting a received RF signal (pg. 3, lines 17-18), said RF signal comprising a plurality of information channel signals each comprising different code division multiple access data spread

using a different spreading codes, wherein each of said plurality of information channel signals are transmitted in one of a plurality of transmission bands, and each of said plurality of information channel signals is carried on one of a plurality of carrier frequencies (pg. 2, line 26 - pg. 3, line 13); an oscillator (305) for generating a single oscillator signal when operating in a first mode, a single down-converter (304) coupled to said initial RF stage and said oscillator, said down-converter for receiving said received RF signal and multiplying said received RF signal by said plurality of oscillator signals when the receiver operates in the first mode, and multiplying said received RF signal by said single oscillator signal when the receiver operates in a first mode to generate an intermediate signal; and a baseband stage (350), coupled to said single down-converter, said baseband stage for processing said intermediate signal.

Applicant's Admitted Prior Art does not teach the oscillator generating a plurality of signals each at a different frequency when operating in a second mode or the single down-converter multiplying the received RF signal by a plurality of oscillator signals when operating in the second mode.

However, Smith et al. teaches in Fig. 3, a CDMA receiver (col. 2, lines 56-60) operating in dual modes (col. 7, lines 5-6) wherein he discloses an oscillator (105, col. 3, lines 60-65) for generating a single oscillator signal when operating in a first and second mode. Smith et al. discloses the invention having two or more modes (col. 2, lines 61-67; col. 3, lines 49-51). Smith et al. discloses the single frequency converter (209) multiplying the input RF signal by an oscillator signal (dependent upon the mode) supplied by the tunable frequency synthesizer (105) col. 8, lines 28-52). Smith et al. does not explictly teach the oscillator generating a plurality of oscillator signals each at a different frequency or the down converter multiplying of the RF

signal by a plurality of oscillator signals though he does teach the receiver capable of operating at more than two modes, among them a multiple frequency mode (col. 9, lines 24-28). It would be obvious to one of ordinary skill in the art that the frequency synthesizer would supply a plurality of oscillator signals during the operation of this mode to form multiple f_{Lo} signals for down conversion of the multiple frequency signals.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Smith et al. as a method lowering cost and weight of the device (col. 2, lines 34-46).

As noted above, Smith et al. does not explictly teach the down-converter multiplying the RF signal by a plurality of oscillator signals or an oscillator for generating a plurality of oscillator signals each at a different frequency. However a down converter multiplying an RF signal by a plurality of oscillator signals and an oscillator for generating a plurality of oscillator signals each at a different frequency is well known in the art as disclosed by Sakoda et al. Sakoda et al teaches in Fig. 4, a single down converter (15) for multiplying an RF signal by a plurality of oscillator signals, the plurality of oscillator signal each at a different frequency (pg. 3, paragraph 0039). Sakoda et al. teaches the frequency synthesizer generating signals at an interval of 150kHz being supplied to the down converter.

It would have been obvious to one skilled in the art to incorporate the teachings of Sakoda et al. for down conversion of each carrier frequency contained in a multicarrier or multi-band signal to obtain the data carried on each carrier frequency.

8. Claims 23-24, 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Smith et al. (US Patent 6,389,059 B1) and Sakoda et al. (US 2001/0043583 A1) and further in view of Igarashi et al. (US Patent 6,236,848 B1).

(1) With regard to claim 23, claim 23 discloses the receiver of claim 21 on a chip apparatus. As noted above, Applicant's Admitted Prior Art in combination with Smith et al. and Sakoda et al. disclose all limitations of the receiver. They do not however explicitly teach the receiver and down-converter as a chip apparatus.

However, Igarashi et al. discloses a receiver integrated circuit for a mobile telephone operating in dual modes (abstract, col. 1, lines 5-10).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Igarashi et al. to decrease cost and improve performance over discrete components.

(2) With regard to claim 24, claim 24 discloses limitations substantially similar to those disclosed in claims 6, and 22. Therefore a similar rejection applies.

(3) With regard to claim 37, Igarashi et al. also discloses wherein the chip apparatus is comprised of at least one integrated circuit (abstract, col. 1, lines 5-10).

(4) With regard to claim 38, Igarashi et al. also discloses wherein the chip apparatus is comprised of a single integrated circuit chip (abstract, col. 1, lines 5-10).

(5) With regard to claim 38, Applicant's Admitted Prior Art also discloses in Fig. 3, the chip apparatus of claim 38, further comprising a down converter (308, 309) that converts the down-converted received RF signal to in phase (I) and quadrature (Q) component signals.

(6) With regard to claim 40, Applicant's Admitted Prior Art also teaches in Fig. 4, the chip apparatus of claim 39, further comprising a first filter (301), a first amplifier (LNA), a second filter (BPF), and a second amplifier (RFA), wherein the received RF signal is successively filtered, amplified, filtered, and amplified in a single signal path before being down converted by the single down converter.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Csapo et al. discloses in US 6,801,788 B1 Distributed Architecture For A Base Station Transceiver Subsystem Having A Radio Unit That Is Remotely Programmable.

b.) Csapo et al. discloses in US 6,411,825 B1 Distributed Architecture For A Base station Transceiver Subsystem.

c.) Sorrells et al. discloses in US Patent 6,580,902 B1 Frequency Translation Using Optimized Switch Structures.

d.) Ichihara discloses in US Patent 5,878,087 Signal Communication Device Operable In A CDMA Mode And An FM Mode.

e.) Sawada et al. discloses in US Patent 6,154,166 Microwave Detector.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams
lbw
May 12, 2007

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER